

# Materials Advances

An open access journal publishing across the breadth of materials science

[rsc.li/materials-advances](https://rsc.li/materials-advances)

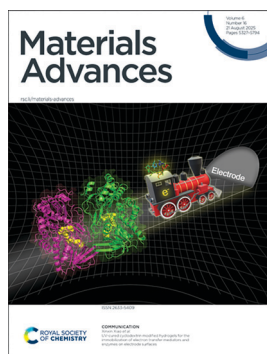
The Royal Society of Chemistry is the world's leading chemistry community. Through our high impact journals and publications we connect the world with the chemical sciences and invest the profits back into the chemistry community.

## IN THIS ISSUE

ISSN 2633-5409 CODEN MAADC9 6(16) 5327-5794 (2025)



**Cover**  
See Junji Murata *et al.*, pp. 5424–5438.  
Image reproduced by permission of Junji Murata from *Mater. Adv.*, 2025, 6, 5424.



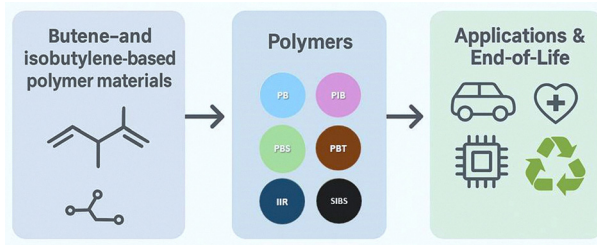
**Inside cover**  
See Xinxin Xiao *et al.*, pp. 5419–5423.  
Image reproduced by permission of Xinxin Xiao from *Mater. Adv.*, 2025, 6, 5419.

## REVIEWS

5339

### Polybutene, polyisobutylene, and beyond: a comprehensive review of synthesis to sustainability

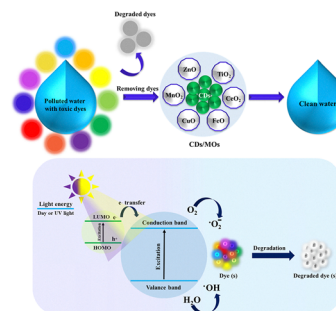
J. I. Mnyango,\* B. Nyoni, N. Mama, B. G. Fouda-Mbanga, Z. Tywabi-Ngeva and S. P. Hlangothi\*



5391

### Dyes and their toxicity: removal from wastewater using carbon dots/metal oxides as hybrid materials: a review

Kawan F. Kayani,\* Sewara J. Mohammed, Muhammad S. Mustafa and Shujahadeen B. Aziz



# Environmental Science: Atmospheres

GOLD  
OPEN  
ACCESS

Connecting communities  
and inspiring new ideas

[rsc.li/submittoEA](https://rsc.li/submittoEA)

Fundamental questions  
Elemental answers

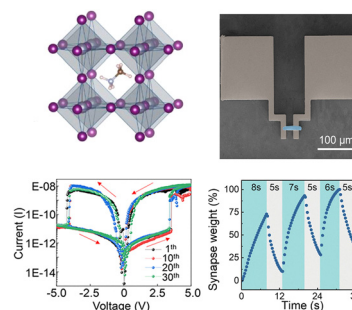


## HIGHLIGHT

5410

## Single crystal halide perovskites for resistive switching memory devices and artificial synapse

Hyojung Kim

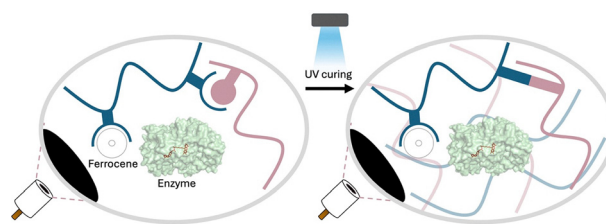


## COMMUNICATION

5419

## UV-cured cyclodextrin modified hydrogels for the immobilization of electron transfer mediators and enzymes on electrode surfaces

Johanne Stagsted Kristensen, Ruiqi Jing, Qiuyue Peng, Thorbjørn Terndrup Nielsen, Emil Riis Wolfhagen, Junjun Tan, Kim Lambertsen Larsen and Xinxin Xiao\*

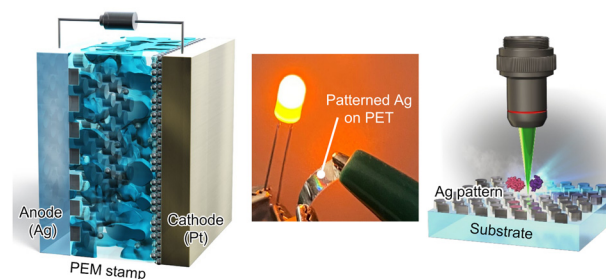


## PAPERS

5424

## Maskless soft lithography for fabricating micro- and nano-scale Ag structures via solid-state electrochemical etching using a polymer electrolyte membrane for optoelectronic and sensing applications

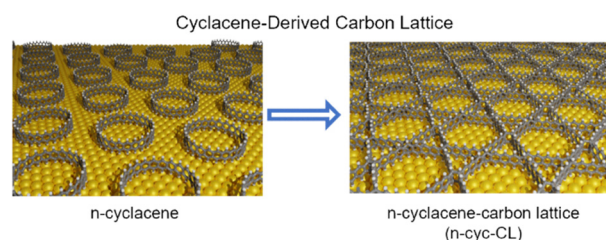
Tatsuya Fujii, Daishi Hakozaki, Atsuki Tsuji, Masaru Takizawa and Junji Murata\*



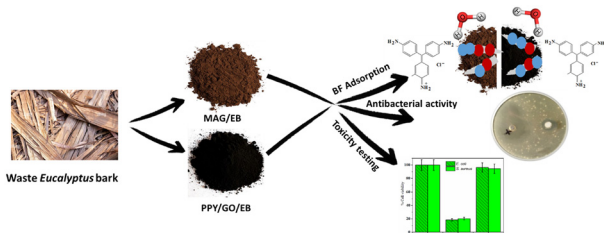
5439

Cyclacene-derived carbon lattices with distorted hexagonal tiling and in-plane  $\pi$ -orbitals: coexistence of flat and Dirac bands

Divanshu Gupta, Michael Mastalerz, J. Michael Gottfried and Holger F. Bettinger\*



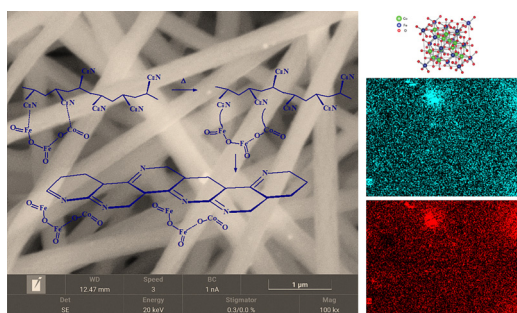
5449



### CuFe<sub>2</sub>O<sub>4</sub>/EB and PPY/GO/EB materials for the removal of basic fuchsin from wastewater: kinetic, equilibrium and thermodynamic studies

Muhammad Ahsan Rashid, Mahwish Iqbal, Sidra Perveen, Haq Nawaz Bhatti,\* Fatimah M. Alzahrani and Munawar Iqbal\*

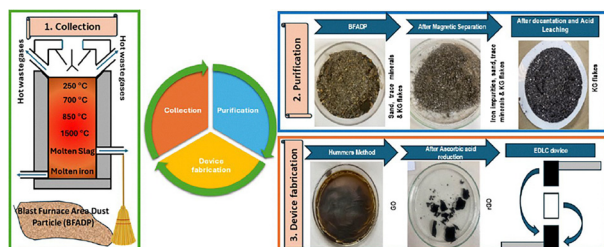
5475



### Impact of thermal treatment and magnetic field on the dynamic mechanical behavior of polyacrylonitrile nanofibers with embedded magnetic ferrite nanoparticles

Baran Sarac, Viktor Soprunyuk, Eray Yüce, Selin Gümrükçü, Wilfried Schranz\* and A. Sezai Sarac

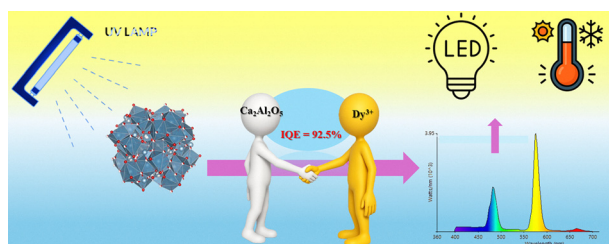
5486



### From steel waste to energy storage: kish graphite derived graphene electrodes for high performance supercapacitors

Ankitha Rao, Somashekara Bhat,\* Shounak De, Adarsh Rag S and Vipin Cyriac

5506



### Insights into structural, luminescence and temperature-dependent emission characteristics of Ca<sub>2</sub>Al<sub>2</sub>O<sub>5</sub>:Dy<sup>3+</sup> phosphors for advanced lighting applications

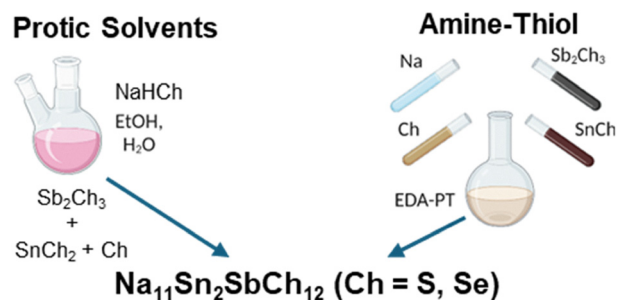
A. Vidya Saraswathi, Tejas, S. Masilla Moses Kennedy, A. Princy, M. I. Sayyed, Aljawhara H. Almuqrin, Vikash Mishra and Sudha D. Kamath\*



5523

### Design strategies for liquid-phase synthesis of sodium-based quaternary solid-state electrolytes

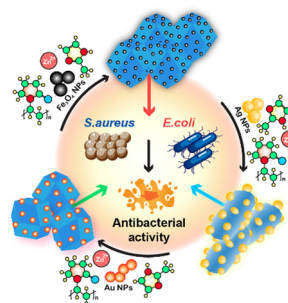
Saeed Ahmadi Vaselabadi,\* Brynn Benham and Colin A. Wolden



5538

### Preparation of ZIF-8-based nanocomposites and their notable antibacterial activities

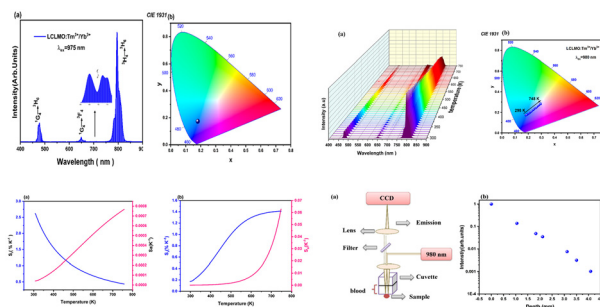
Le Hong Tho, Do Thao Anh, Hanh Kieu Thi Ta, Bang Thang Phan, Sungkyun Park, Seyoung Kwon, Kieu The Loan Trinh and Nhu Hoa Thi Tran\*



5546

### Dual-functional $\text{Tm}^{3+}/\text{Yb}^{3+}$ -doped $\text{LiCaLa}(\text{MoO}_4)_3$ phosphors: high-sensitivity thermal sensing and deep-tissue NIR bio-imaging

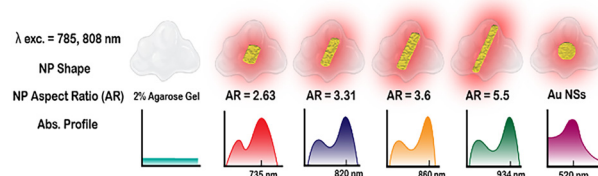
Ikhlas Kachou, Kamel Saidi, Zein El Abidine Aly Taleb, Christian Hernández-Álvarez, Mohamed Dammak\* and Inocencio R. Martín



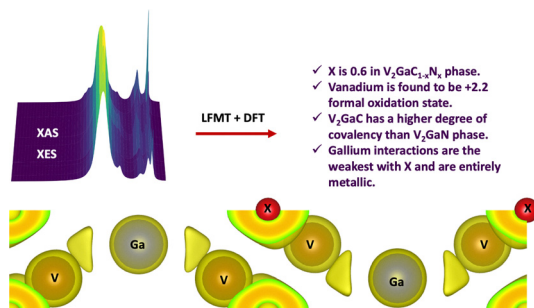
5558

### Plasmonic enhancement of photothermal conversion in hydrogels using gold nanorods

Mai S. Rashwan, Md. Masud Alam, Seyed Hassan Jaberi, Abdel-Aziz Al-Sheikh, Anna Cristina S. Samia, Harihara Baskaran\* and Clemens Burda\*



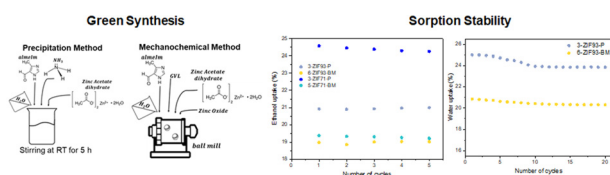
5568



### Bonding profiling of gapless ceramic $V_2GaC/N$ MAX phases: a spectroscopic and dual theoretical approach

Peter Ufondu,\* Sakshi,\* Teak D. Boyko, Niels Kubitza, Christina S. Birkel and Alexander Moewes

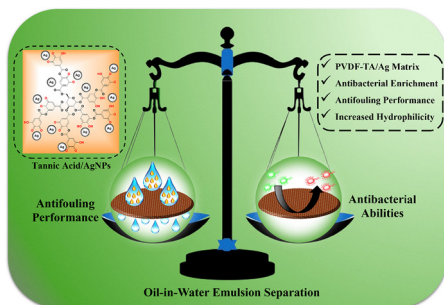
5576



### Unveiling the impact of synthesis routes on water and ethanol sorption performance of ZIF-71 and ZIF-93

Ciara Byrne,\* Katja Vodlan, Connor Hewson, Paul Iacomi, Amalija Golobčič and Nataša Zabukovec Logar

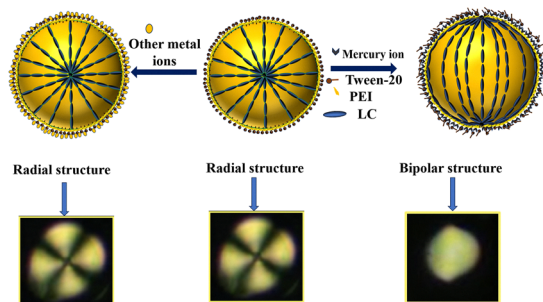
5588



### Dual-functional tannic acid-infused AgNPs-PVDF membranes *via* coagulation methods: an integrated study on antibacterial and antifouling performances for oil-in-water separation

Irshad Kammakakam,\* Ishfaq Showket Mir, Nadeem Baig,\* Ali Riaz and Younés Messaddeq

5605



### Rapid detection of mercury ions in water using functionalized liquid crystal microdroplets

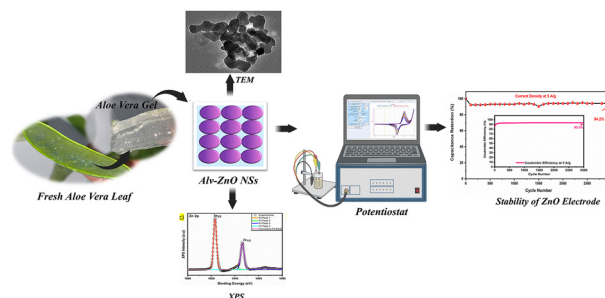
Saumya Ranjan Pradhan, Krishnakanth Chithari, Ramadevi Suguru Pathinti and Jayalakshmi Vallamkondu\*



5618

### Structural, optical, surface chemical, and electrochemical characterization of Aloe vera-assisted ZnO nanostructures for supercapattery applications

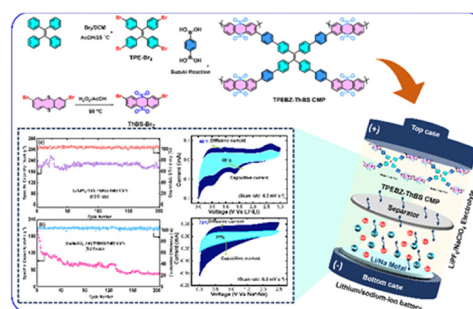
Mohit Bhatt,\* Kajal Gautam, Akarsh Verma and A. K. Sinha\*



5633

### Synergistic bifunctional conjugated microporous polymer as an organic anode containing tetraphenylethene and thianthrene-5,5',10,10'-tetraoxide units for lithium and sodium-ion batteries

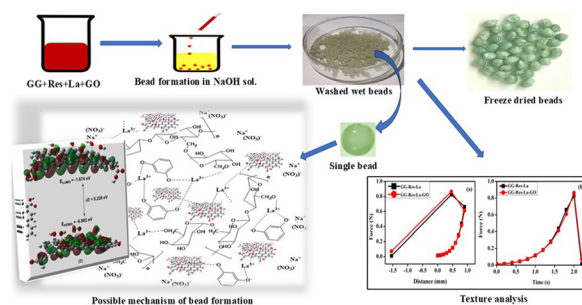
Bhargabi Halder, Mohamed Gamal Mohamed,\* Kannadasan Kalidoss, Ahmed A. K. Mohammed, Poonam Nagendra Singh, Tapomay Mondal, Yunsheng Ye, Perumal Elumalai\* and Shiao-Wei Kuo\*



5648

### Design and DFT-based optimization of a GO-containing guar gum hydrogel for dye removal

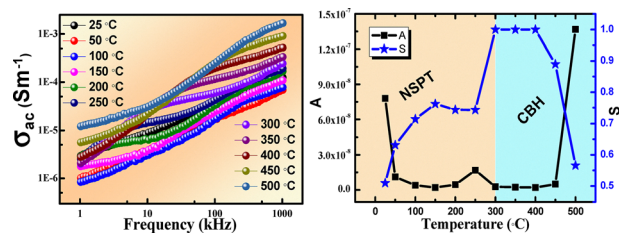
Reyaz Ahmad Rather, Jan Mohammad Mir, Mushtaq Ahmad Bhat and Aabid Hussain Shalla\*



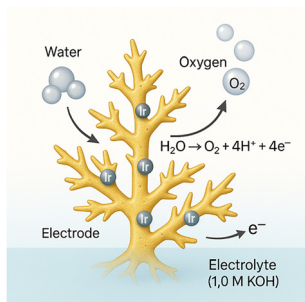
5667

### Unveiling the electrical and energy storage performance of SrBi4Ti4O15 for device applications

Rojalin Panda,\* Sudhansu Sekhar Hota, Debasish Panda and Ram Naresh Prasad Choudhary



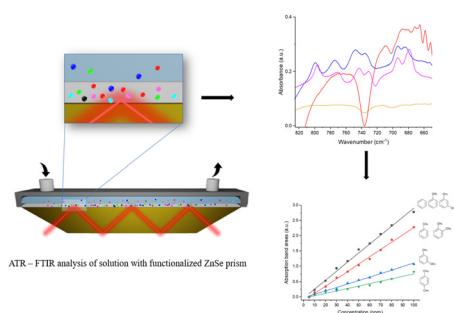
5677



### Surface-engineered Ir/Au dendritic catalysts with minimal iridium loading for efficient alkaline oxygen evolution

Chih-En Tsai, Yi-Ting Wang and Ying-Huang Lai\*

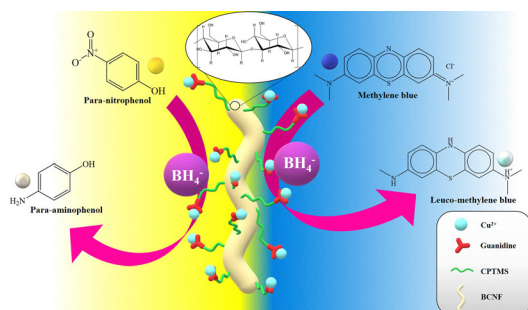
5687



### Mid-Infrared monitoring of aromatic hydrocarbons in an aquatic environment based on polyhydroxyalkanoate biopolymers for use in a chalcogenide infrared microsensor

Martin Vrážel, Duc Trung Tran, Patrick Louergue, Anthony Szymczyk, Radwan Chahal, Anthony Courtois, Marek Bouška, Joel Charrier, Petr Němec and Virginie Nazabal\*

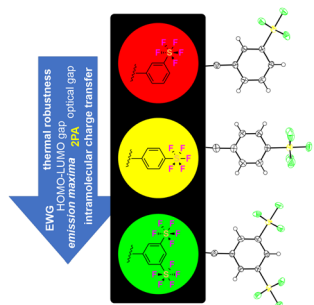
5701



### Fabrication and catalytic efficiency of functionalized bacterial cellulose nanofibers for the reduction of 4-nitrophenol and methylene blue

Niloofer Salimi-Turkamani, Mohamadmahdi Moghadari, Hossein Ghafuri\* and Haniyeh Dogari

5713



### Selective employment of electronic effects of the pentafluorosulfonyl group across linear and tripodal push-pull chromophores with two-photon absorption

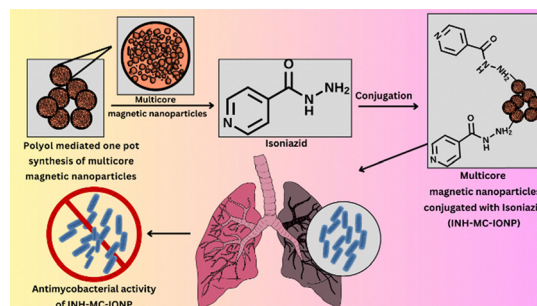
Michaela Fecková, Milan Klikar, Chrisovalantou Vourdaki, Ioannis Georgoulis, Oldřich Pytela, Sylvain Achelle, Zdeňka Růžicková, Mihalís Fakis,\* Petr Beier and Filip Bureš\*



5726

### Isoniazid-loaded multicore magnetic nanoparticles as a facile intervention for combating mycobacterial infection

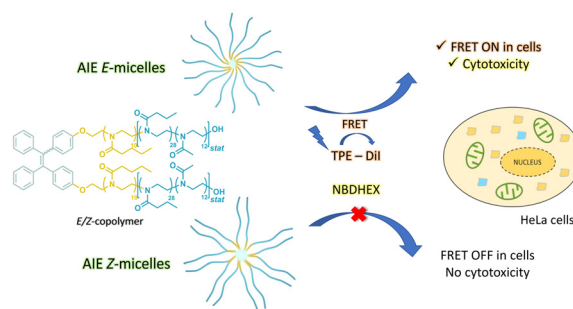
Lipsa Leena Panigrahi, Ashirbad Sarangi, Bhabani Shankar Das, Shashank Shekhar, Debapriya Bhattacharya and Manoranjan Arakha\*



5742

### Micelles based on a poly(2-oxazoline) triblock copolymer containing a pure stereoisomer *E* or *Z*-tetraphenylethylene core for theranostic applications

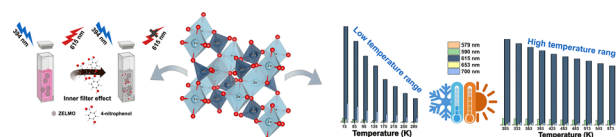
Stéphane Hoang, Guillaume Pinna, Marie Vandamme, Magali Allain, Catherine Passirani, Patrick Saulnier and Oksana Krupka\*



5758

### Thermally stable Li<sup>+</sup> co-doped ZnMoO<sub>4</sub>:Eu<sup>3+</sup> phosphors for white LEDs, nitroaromatic sensing and low temperature non-contact optical thermometry applications

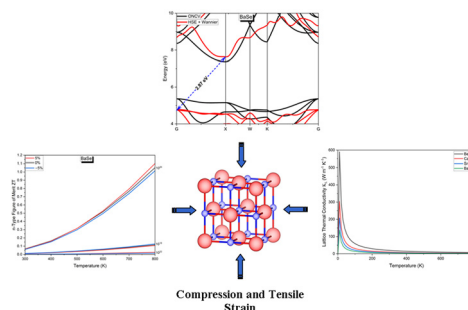
Astha Tyagi, M. Rakshita, D. Haranath and Chikkadasappa Shivakumara\*



5777

### Advanced study of the electronic and thermoelectric properties of AEMSe compounds under compression and tensile strain

Hiren S. Patel, Vishnu A. Dabhi and Aditya M. Vora\*



## CORRECTION

5792

**Correction: Environmental materials: CO<sub>2</sub>-adsorbing clays for enhancing soil fertility and agricultural sustainability**

Faizah Altaf, Shakeel Ahmed, Shahid Ali, Muhammad Mansha and Safyan Akram Khan\*

